

Fish

Arctic Grayling (*Thymallus arcticus*)*

State Rank: S1
Global Rank: G5

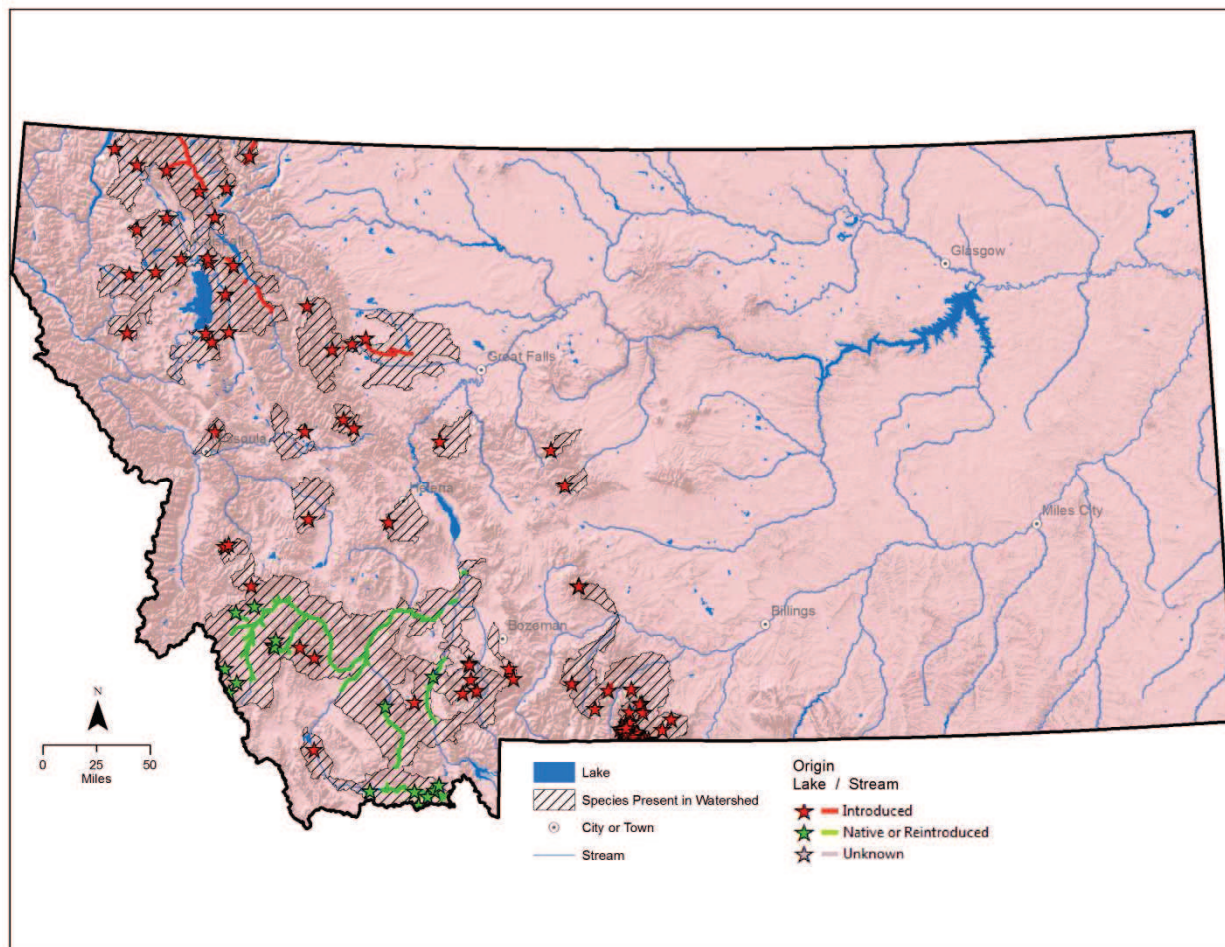


Figure 40. Distribution of Arctic grayling

Habitat

The arctic grayling occurs in both ponds/lakes as well as riverine systems; however, these differences make 2 distinct life histories of either adfluvial or fluvial populations. Cool temperatures are needed to sustain populations, and a gravelly substrate is needed for breeding purposes.

Management

On September 8, 2010, USFWS determined that the upper Missouri River basin Distinct Population Segment of Arctic Grayling warrants protection under the ESA, but that listing the species under the ESA is precluded by the need to address other listing actions of a higher priority. A proposed rule for potential ESA listing (endangered, threatened, or not warranted) will be issued in the fall of 2014, and a final rule in the fall 2015.

Habitat alterations are a key factor in the loss of fluvial Arctic grayling in most of their historic range in Montana. In an effort to conserve and recover the remaining fluvial grayling population in Montana, over the last decade FWP and numerous partners have engaged private landowners in the Big Hole Valley to aid grayling recovery through enhancement of habitat. Implemented through a USFWS approved CCAA program, the goal of the effort is to secure Arctic grayling in the upper Big Hole River by improving streamflow, protecting and enhancing stream habitat and riparian areas, increasing fish passage, and eliminating entrainment of fish in irrigation ditches.

An Arctic Grayling Work Group meets on an annual basis to develop grayling conservation strategies and work plans. The technical advisory group is chaired by FWP and includes participants from state and federal resources agencies, universities, and private interest groups.

To formalize commitments to Arctic grayling conservation in Montana, in 2007, the *Memorandum of Understanding Concerning Montana Arctic Grayling Restoration* was developed and signed by numerous state, federal, and private stakeholders. The Memorandum commits the parties to a cooperative restoration program, and provides a means to obligate financial resources as they are available.

FWP has developed 2 conservation broods from aboriginal Big Hole River fluvial stock for fluvial grayling restoration purposes and occasional lake stocking in south-central Montana. The conservation broods, maintained in 2 lakes in the Madison and Gallatin river drainages, are to be used in efforts to reestablish native fluvial grayling in portions of their historic range, including most recently the Ruby River near Alder, Montana. A similar restoration effort in Elk Lake, near Lima, Montana, is being implemented to “replicate” the adfluvial aboriginal Red Rocks Lake population and expand the range of Arctic grayling to habitat it once occupied.

Management Plans

Montana Fish, Wildlife & Parks. 2007. *Memorandum of Understanding Concerning Montana Arctic Grayling Restoration*.

Montana Fish, Wildlife & Parks. 2013. *Montana Statewide Fisheries Management Plan, 2013-2018*. Montana Fish, Wildlife & Parks, Helena, Montana. 478 pp.

Montana Fluvial Arctic Grayling Workgroup. 1995. *Montana Fluvial Arctic Grayling Restoration Plan*. Montana Department of Fish, Wildlife & Parks, Helena, Montana. *Currently under revision*

U.S. Fish and Wildlife Service. 2006. *Candidate conservation agreement with assurances for Arctic grayling in the upper Big Hole River*. FWS Tracking # TE104415-0.

Arctic Grayling Current Impacts, Future Threats, and Conservation Actions

Current Impacts	Future Threats	Conservation Actions
Blockage of fish passage by irrigation diversions	Blockage of fish passage by irrigation diversions	Work with landowners and land management agencies to limit activities that may be detrimental to this species
Displacement by non-native rainbow and brook trout	Displacement by non-native rainbow and brook trout	Barrier installation to prevent displacement or competition Determine the effect of non-native trout on Arctic grayling Reduce stocking of non-native fish Reintroduce grayling into areas where they formerly existed
Low flows during severe drought decrease survival of older arctic grayling due to high water temperatures, increased susceptibility to predation, and diminished habitat volume	Low flows during severe drought decrease survival of older arctic grayling due to high water temperatures, increased susceptibility to predation, and diminished habitat volume	Riparian rehabilitation projects to identify degraded habitats on the Big Hole River Work with landowners and land management agencies to limit activities that may be detrimental to this species
Overharvest: Arctic grayling are easily caught by anglers and are susceptible	Overharvest: Arctic grayling are easily caught by anglers and are susceptible	Continue to modify harvest as needed
Riparian vegetation and streambanks affected by range or forest management practices, mass willow removal, and dewatering of the river for agricultural uses have negatively impacted fish habitat	Riparian vegetation and streambanks affected by range or forest management practices, mass willow removal, and dewatering of the river for agricultural uses have negatively impacted fish habitat	Assist private landowners with funding to improve habitat Continue to support Arctic grayling CCAA (USFWS 2006) Habitat restoration and enhancement Support management of grazing to maintain riparian vegetation and streambank and channel stability in excellent condition

Current Impacts	Future Threats	Conservation Actions
	Climate change	Continue to evaluate current climate science models and recommended actions Monitor habitat changes and address climate impacts through adaptive management as necessary Routine monitoring of known populations

* Only native or reintroduced populations will be addressed.

Additional Citations

Montana Fish, Wildlife & Parks. 2007. Memorandum of Understanding Concerning Montana Arctic Grayling Restoration.

U.S. Fish and Wildlife Service. 2006. Candidate conservation agreement with assurances for Arctic grayling in the upper Big Hole River. FWS Tracking # TE104415-0.

Blue Sucker (*Cycleptus elongates*)

State Rank: S2S3
Global Rank: G3G4

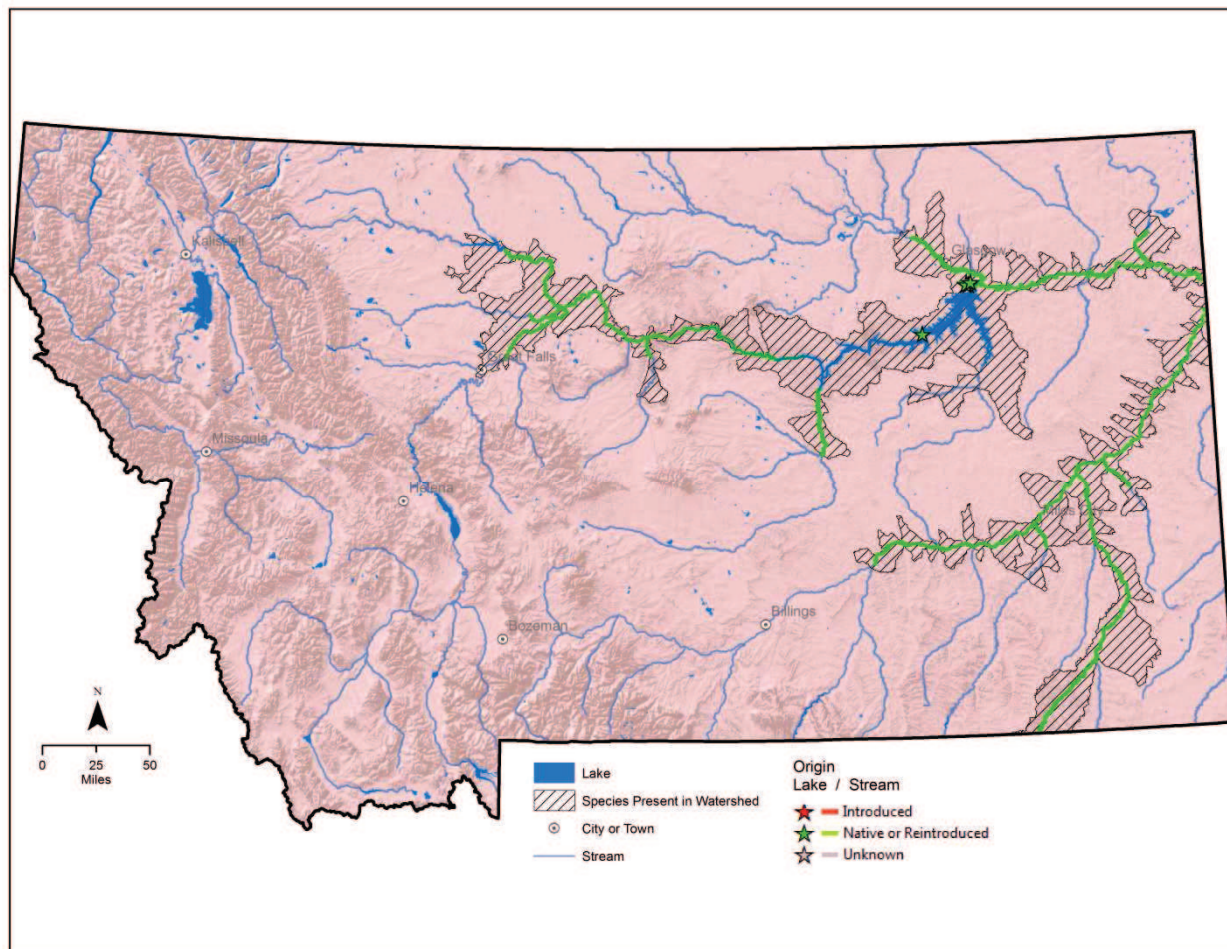


Figure 41. Distribution of blue sucker

Habitat

The blue sucker is adapted for life in swift currents with low turbidity. This fish prefers swift current areas of large rivers, feeding on insects in cobble areas (Moss et al. 1983). In the spring blue suckers migrate upriver and congregate in fast rocky areas to spawn. Large numbers have been observed migrating up tributary streams to spawn. The Tongue, Marias, Milk, and Teton rivers are the tributary streams most heavily used.

Management

Management of the blue sucker consists primarily of routine monitoring of population status and habitat protection. Currently, there is no management plan for blue suckers in Montana. The blue sucker is considered an indicator species for ecotype health because of its habitat-specific requirements, particularly migration needs that are impacted by barriers (i.e., diversions and impoundments). Current monitoring information indicates the populations are in stable condition.

Management Plans

Montana Fish, Wildlife & Parks. 2013. Montana Statewide Fisheries Management Plan, 2013-2018. Montana Fish, Wildlife & Parks, Helena, Montana. 478 pp.

Blue Sucker Current Impacts, Future Threats, and Conservation Actions

Current Impacts	Future Threats	Conservation Actions
Changes in riparian habitat and less regeneration of woody trees and understory	Changes in riparian habitat and less regeneration of woody trees and understory	Continue conservation of habitats by managing grazing in riparian areas Work with landowners and land management agencies to limit activities that may be detrimental to this species
Channelization of large lotic systems	Channelization of large lotic systems	Protect natural minimum instream flow reservations
Habitat changes and fragmentation caused by large dams that block passage to spawning grounds, alter stream flow, and eliminate peak flows that initiate spawning runs. Dams also discharge cold, clear water as opposed to the warm, turbid waters in which these species evolved	Habitat changes and fragmentation caused by large dams that block passage to spawning grounds, alter stream flow, and eliminate peak flows that initiate spawning runs. Dams also discharge cold, clear water as opposed to the warm, turbid waters in which these species evolved	Consider preparing a management plan for the blue sucker or include it into other comprehensive taxonomic plans Regulate water regimes to be more closely tied to natural water regimes
	Climate change	Continue to evaluate current climate science models and recommended actions Monitor habitat changes and address climate impacts through adaptive management as necessary Routine monitoring of known populations

Additional Citations

Moss, R. E., J. W. Scanlan, and C. S. Anderson. 1983. Observations on the natural history of the blue sucker (*Cycleptus elongatus* LeSueur) in the Neosho River. The American Midland Naturalist 109(1):15–22.

Bull Trout (*Salvelinus confluentus*)

State Rank: S2
Global Rank: G4

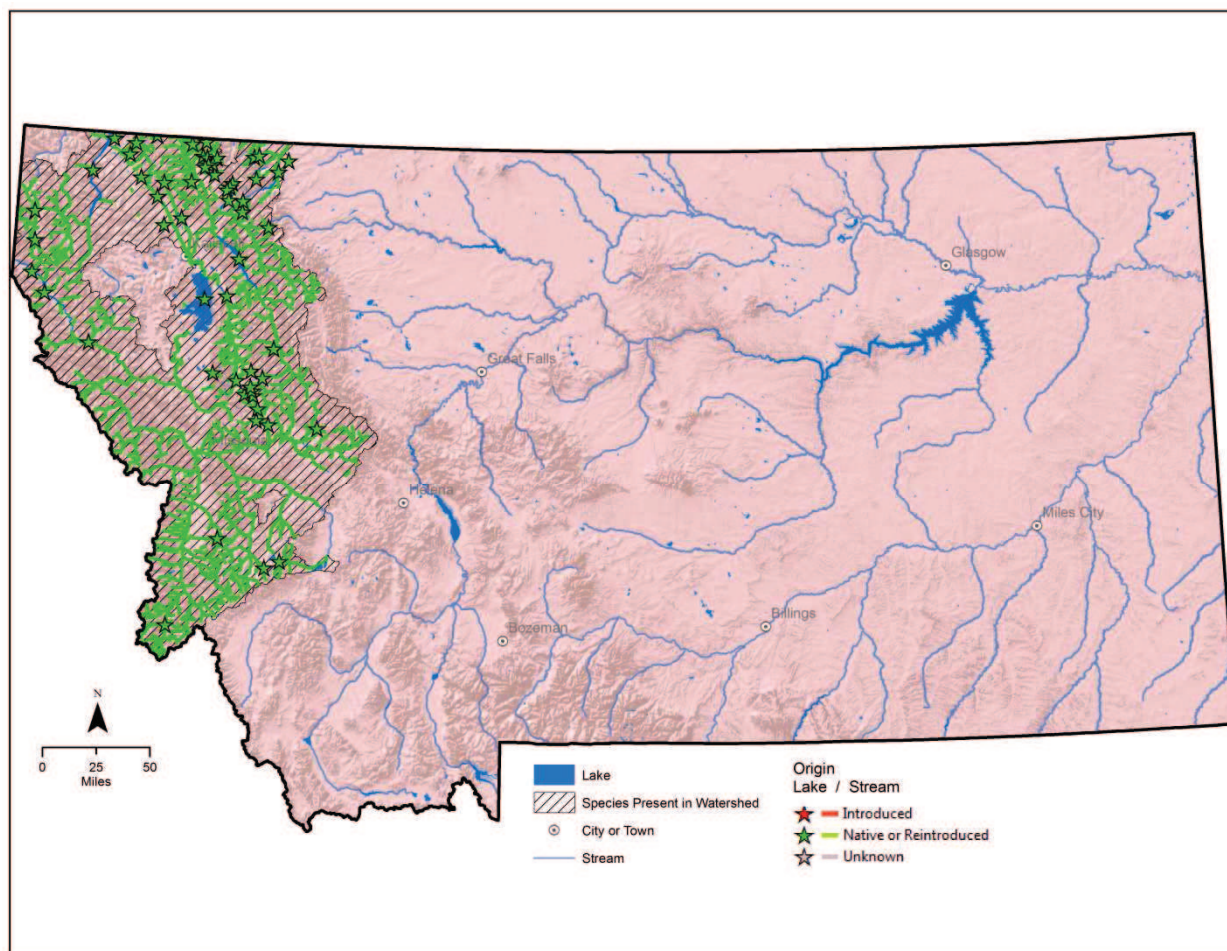


Figure 42. Distribution of bull trout

Habitat

Subadult and adult fluvial bull trout reside in larger streams and rivers and spawn in smaller tributary streams, whereas adfluvial bull trout reside in lakes and spawn in tributaries. A “resident” life history form, common in some areas, never leave natal tributaries. Bull trout spawn in cold headwater streams with clean gravel bottoms (Brown 1971; Holton 1981).

Several studies report bull trout local population genetic divergence down to the geographic scale of adjacent tributaries (Leary et al. 1993; Kanda et al. 1997; Spruell et al. 1999; Taylor et al. 1999). Based on similar patterns of population genetic structure in steelhead, Parkinson (1984) suggested that populations in geographically adjacent streams be managed as separate stocks.

Management

While bull trout remain widespread in Montana, significant declines in abundance have been observed in most populations. Major causes for these declines include changes in habitat that reduce spawning success, barriers that prevent movement of migratory fish, and non-native fish

(e.g. lake and brown trout) that prey on or compete and hybridize (e.g., brook trout) with bull trout. Bull trout in the South Fork of the Flathead, above Hungry Horse Reservoir, remain a protected and robust population. Bull trout are a Montana SOC and were listed as an ESA threatened species by the USFWS in 1998 (USFWS 1998).

Because bull trout are a federally listed species, FWP and numerous state, federal, and private partners are active participants in their management and conservation. Habitat protection and restoration, and restoration of migratory corridors (e.g., removal of barriers to movement) are among key elements to bull trout conservation and recovery. The large-scale habitat restoration program in the Blackfoot Valley and the removal of Milltown Dam are notable examples of these types of efforts. The presence of predatory non-native fish, particularly lake trout, northern pike and walleye, is significant but difficult threats to address. An on-going experimental lake trout removal effort in Swan Lake has been implemented to not only aid in the conservation of Swan drainage bull trout, but also to determine whether suppression of non-native species in certain locations can assist in bull trout recovery.

Angling and harvest is closely regulated to prevent additional stress on bull trout populations. Because of their opportunistic feeding habits and late maturity, bull trout are vulnerable to overharvest and poaching/accidental harvest, especially during spawning migrations and when in tributaries (Leathe and Enk 1985; Long 1997; Schmetterling and Long 1999; Carnefix 2002). Some Montana bull trout populations (e.g., Swan, South Fork Flathead, Kootenai, and Blackfoot rivers) responded well to more restrictive angling regulations or closures, and initial conservation efforts in Montana focused on such measures. Currently, intentional angling for bull trout is prohibited everywhere except in Hungry Horse and Lake Koocanusa reservoirs, Swan Lake, and the South Fork of the Flathead River upstream from Hungry Horse reservoir. Hungry Horse Reservoir is currently the only water in the state where a limited bull trout harvest is allowed. Some level of poaching (Swanberg 1996; Long 1997) and accidental harvest due to misidentification (Schmetterling and Long 1999) probably continues to impact some bull trout populations, but it is difficult to detect, quantify, prosecute, or prevent. Recent efforts to reduce misidentification include a bull trout identification and education webpage at the FWP website (<http://fwp.mt.gov/education/angler/bullTroutIdProgram/>).

Management of bull trout is guided by both state and federal documents. In 2000, a State of Montana sponsored effort with multiple stakeholders produced the planning document titled *Restoration Plan for Bull Trout in the Clark Fork River Basin and Kootenai River Basin in Montana* (Montana Bull Trout Restoration Team 2000). This plan sets goals, objectives and criteria for bull trout restoration, outlines actions to meet those criteria, and establishes a structure to monitor implementation and evaluate effectiveness of the plan. Local plans provide direct guidance for local bull trout conservation efforts and include such documents as *An Integrated Stream Restoration and Native Fish Conservation Strategy for the Blackfoot River Basin* (FWP 2005), *Flathead Lake and River Co-Management Plan, 2001 – 2010* (FWP and Confederated Salish and Kootenai Tribes 2001), and *Clark Fork River Native Salmonid Restoration Plan* (Clark Fork Relicensing Team Fisheries Working Group 1998). As a listed species, the USFWS is responsible for developing federal bull trout recovery plans and designation of “critical habitats.” Although critical bull trout habitat in Montana was designated

by the USFWS in 2010, the Federal bull trout recovery plan is still in a draft stage and has yet to be finalized (as of January 2014; USFWS 2002a).

All major river systems in western Montana (except the Yaak River) are designated by the USFWS as Critical Habitat for bull trout (USFWS 2002b). Critical Habitats are specific geographic areas that the USFWS considers essential for conservation and recovery of bull trout and may require special management and protection to meet recovery objectives. Non-native trout species that are popular sport fish can compromise bull trout use of these areas through predation, competition and hybridization. The extent of these impacts vary by water and non-native species present. Historically bull trout have declined in number and distribution, with non-native trout often playing some role in the decline. However, recent management efforts have shown that the presence of non-native trout does not necessarily mean that bull trout populations will decline. Recent harvest restrictions and habitat improvements to enhance bull trout populations have resulted in some populations continuing to decline, some remaining stable (or ceasing the historical decline) and some increasing, all in the presence of non-native trout. Reasons for this variability may include interactions between the non-native trout and bull trout, as well as food web dynamics, and habitat condition or type. Because non-native trout occupy portions of all of the drainages listed as Critical Habitat, a challenge for FWP is to continue to provide recreational fisheries for non-native trout while protecting and establishing viable populations of bull trout. Balancing the 2 is particularly challenging because bull trout populations typically require open systems for migration and this makes them more susceptible to the negative impacts associated with non-native trout.

Management of non-native species using liberalized harvest limits or active suppression is not viewed as a necessary or practical approach to bull trout management in all waters designated by the USFWS as Critical Habitat. Many river reaches identified as Critical Habitat currently support few if any bull trout, or are only seasonally utilized as migratory corridors. Such waters may have substantial habitat alterations that make them unsuitable for viable bull trout populations for the foreseeable future (e.g., Upper Clark Fork River above Flint Creek), or a mix of habitat changes and established non-native trout populations which combined, limit the likelihood that non-native species can be effectively managed to benefit bull trout (e.g., lower Bitterroot River). These river reaches may also support recreationally and economically important trout fisheries that are highly valued destinations for Montanans and out-of-state visitors, and though FWP will continue to evaluate the issue and possible solutions, implementing management techniques (i.e., passive or active suppression) with uncertain benefit to bull trout is unwarranted at this time.

Management Plans

Clark Fork Relicensing Team Fisheries Working Group. 1998. Clark Fork River Native Salmonid Restoration Plan. 63 pp.

Montana Bull Trout Restoration Team. 2000. Restoration plan for bull trout in the Clark Fork River basin and Kootenai River basin, Montana. Montana Department of Fish, Wildlife & Parks, Helena, Montana. 116 pp.

Montana Fish Wildlife and Parks. 2005. An Integrated Stream Restoration and Native Fish Conservation Strategy for the Blackfoot River Basin.

Montana Fish, Wildlife & Parks. 2013. Montana Statewide Fisheries Management Plan, 2013-2018. Montana Fish, Wildlife & Parks, Helena, Montana. 478 pp.

Montana Fish, Wildlife & Parks and Confederated Salish and Kootenai Tribes. 2000. Flathead Lake and River Fisheries Co-Management Plan, 2001 – 2010. 57 pp.

U. S. Fish and Wildlife Service. 2002. Endangered and Threatened Wildlife and Plants: Bull Trout (*Salvelinus confluentus*) Draft Recovery Plan. Available: <http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=E065>

U. S. Fish and Wildlife Service. 2010. Revised Designation of Critical Habitat for Bull Trout in the Coterminous United States; Final Rule. Federal Register / Vol. 75, No. 200 / Monday, October 18, 2010 / Rules and Regulations. Available at: <http://www.fws.gov/pacific/bulltrout/CriticalHabitat.html>

Bull Trout Current Impacts, Future Threats, and Conservation Actions

Current Impacts	Future Threats	Conservation Actions
Habitat degradation and loss due to land and water management practices	Habitat degradation and loss due to land and water management practices	Encourage and support opportunities such as land purchases or conservation easements to conserve upland areas adjacent to occupied bull trout waters Restoration of degraded habitat and preservation of existing healthy habitat Use USFWS bull trout critical habitat document to designate important bull trout areas
Historical overharvest and eradication efforts	Historical overharvest and eradication efforts	Implement and enforce new harvest regulations where necessary
Introduction of non-native fishes resulting in competition, predation, and hybridization threats	Introduction of non-native fishes resulting in competition, predation, and hybridization threats	Increased management of non-native fishes Install barriers when necessary and manipulate fish populations to benefit bull trout when possible Prevent illegal introductions of fish species

Current Impacts	Future Threats	Conservation Actions
Loss of the migratory component of bull trout life history diversity by isolation and fragmentation of populations by both structural (e.g., dams) and environmental (e.g., thermal or pollution) barriers	Loss of the migratory component of bull trout life history diversity by isolation and fragmentation of populations by both structural (e.g., dams) and environmental (e.g., thermal or pollution) barriers	Reestablish connectivity between habitats isolated by constructed barriers
Ongoing poaching and accidental harvest due to misidentification	Ongoing poaching and accidental harvest due to misidentification	Education of bull trout identification and distribution
	Climate change	<p>Continue to evaluate current climate science models and recommended actions</p> <p>Maintain connectivity</p> <p>Monitor habitat changes and address climate impacts through adaptive management as necessary</p> <p>Routine monitoring of known populations</p>

Additional Citations

- Brown, C. J. D. 1971. Fishes of Montana. Big Sky Books, Montana State University, Bozeman, Montana.
- Carnefix, G. 2002. Movement patterns of fluvial bull trout in relation to habitat parameters in the Rock Creek drainage, Missoula and Granite counties, Montana. M.Sc. thesis, University of Montana, Missoula, Montana. 185 pp.
- Clark Fork Relicensing Team Fisheries Working Group. 1998. Clark Fork River Native Salmonid Restoration Plan. 63 pp.
- Holton, G. D. 1981. Identification of Montana's most common game and sport fishes. Montana Outdoors reprint.
- Kanda, N., R. F. Leary, and F. W. Allendorf. 1997. Population genetic structure of bull trout in the upper Flathead River drainage. Pp. 299–308 in W. C. Mackay, M. K. Brewin, and M. Monita, eds. Friends of the bull trout conference proceedings. Bull Trout Task Force (Alberta), c/o Trout Unlimited Canada, Calgary.

- Leary, R. F., F. W. Allendorf, and S. H. Forbes. 1993. Conservation genetics of bull trout in the Columbia and Klamath River drainages. *Conservation Biology* 7:856–865.
- Leathe, S. A., and M. D. Enk. 1985. Cumulative effects of micro-hydro development on the fisheries of the Swan River drainage, Montana. Report prepared for Bonneville Power Administration, Division of Fish and Wildlife. 114 pp. + appendices.
- Long, M. H. 1997. Sociological implications of bull trout management in northwest Montana: illegal harvest and game warden efforts to deter poaching. Pp. 71–73 in W. C. Mackay, M. K. Brewin, and M. Monita, eds. Friends of the bull trout conference proceedings. Bull Trout Task Force (Alberta), c/o Trout Unlimited Canada, Calgary.
- Montana Bull Trout Restoration Team. 2000. Restoration plan for bull trout in the Clark Fork River basin and Kootenai River basin, Montana. Montana Department of Fish, Wildlife & Parks, Helena, Montana. 116 pp.
- Montana Fish Wildlife and Parks. 2005. An Integrated Stream Restoration and Native Fish Conservation Strategy for the Blackfoot River Basin.
- Montana Fish, Wildlife & Parks and Confederated Salish and Kootenai Tribes. 2000. Flathead Lake and River Fisheries Co-Management Plan, 2001 – 2010. 57 pp.
- Parkinson, E. A. 1984. Genetic variation in populations of steelhead trout (*Salmo gairdneri*) in British Columbia. *Canadian Journal of Fisheries and Aquatic Sciences* 41:1412–1420.
- Schmetterling, D. A., and M. H. Long. 1999. Montana anglers' inability to identify bull trout and other salmonids. *Fisheries* 24:24–27.
- Spruell, P., B. E. Rieman, K. L. Knudsen, F. M. Utter, and F. W. Allendorf. 1999. Genetic population structure within streams: microsatellite analysis of bull trout populations. *Ecology of Freshwater Fish* 8:114–121.
- Swanberg, T. R. 1996. The movement and habitat use of fluvial bull trout in the upper Clark Fork River drainage. Master's thesis, University of Montana, Missoula, Montana. 61 pp.
- Taylor, E. B., S. Pollard, and D. Louie. 1999. Mitochondrial DNA variation in bull trout (*Salvelinus confluentus*) from northwestern North America: implications for zoogeography and conservation. *Mol. Ecol.* 8:1155–1170.
- U.S. Fish and Wildlife Service. 1998. Endangered and threatened wildlife and plants: determination of threatened status for the Klamath River and Columbia River distinct population segments of bull trout. *Federal Register* 63:31647–31674.
- United States Fish and Wildlife Service. 2002a. Endangered and Threatened Wildlife and Plants: Bull Trout (*Salvelinus confluentus*) Draft Recovery Plan. Available: <http://www.fws.gov/pacific/bulltrout/Recovery.html>.

United States Fish and Wildlife Service. 2002b. Endangered and Threatened Wildlife and Plants: proposed designation of critical habitat for the Klamath River and Columbia River distinct population segments of bull trout. Federal Register 67:71235–71284. Available at <http://www.fws.gov/pacific/bulltrout/CriticalHabitat.html>.

Columbia River Redband Trout (*Oncorhynchus mykiss gairdneri*)

State Rank: S1
 Global Rank: G5T4

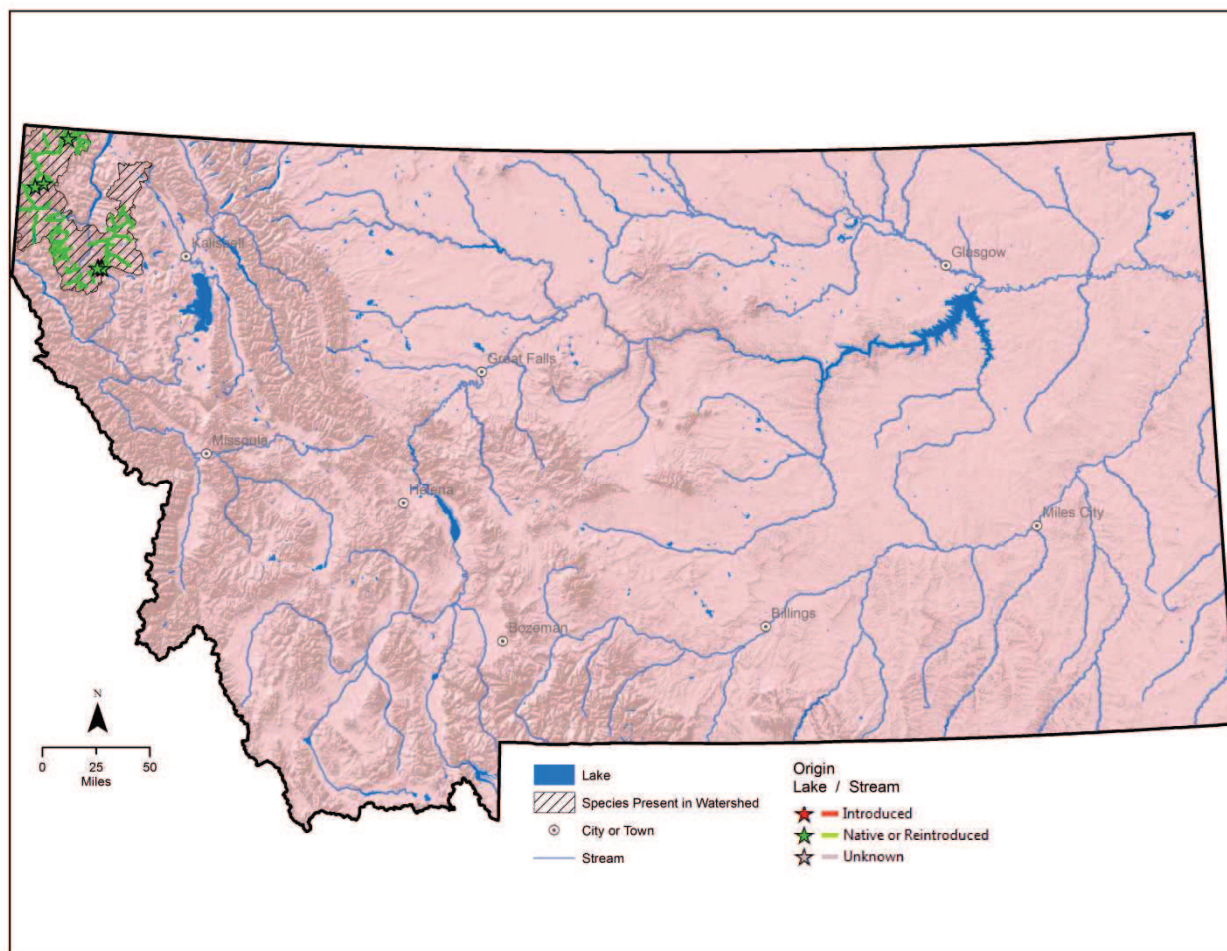


Figure 43. Distribution of Columbia River redband trout

Habitat

The seasonal habitat requirements of redband trout in the Kootenai River drainage in Montana were investigated during 1997 and 1998 (Hensler and Muhlfeld 1999; Muhlfeld 1999; Muhlfeld et al. 2001). Summer results demonstrated that juvenile and adult redband trout prefer deep microhabitats (more than 1.3 feet) with low to moderate velocities (less than 1.6 feet/second) adjacent to the thalweg. Conversely, age-0 redband trout select slow water (less than 0.3 feet/second) and shallow depths (less than 0.7 feet) located in lateral areas of the channel. All ages of redband trout strongly selected pools and avoided riffles; runs were used generally as expected (based on availability) by juveniles and adults and more than expected by age-0 redband trout. At the macrohabitat scale, a multiple regression model indicated that low-gradient, mid-elevation reaches with an abundance of complex pools are critical areas for the production of redband trout. Mean reach densities ranged from 0.008 to 0.08 fish/yd². During the fall and winter period, adult redband trout occupied small home ranges and found suitable overwintering habitat in deep pools with extensive amounts of cover in headwater streams. In Basin Creek, adult redband trout commenced spawning (e.g., redd construction) during June as spring flows subsided following peak runoff. Redband trout generally selected redd sites in shallow pool tail-

out areas (mean depth = 0.89 feet; range: 0.66 to 1.51) with moderate water velocities (mean velocity = 1.6 feet/second; range: 0.75 to 2.26 feet/second) dominated by gravel substrate.

Management

FWP and land managers (state, federal and private) are integral partners in the management of redband trout. Current management efforts include assessing and monitoring remaining populations; protecting important habitats; and developing long-term conservation strategies that may include removal of non-native trout and placement of barriers to prevent their return, and reintroduction of redband trout to streams where they have been lost. In addition, since 2002 FWP has been developing and testing a redband trout broodstock at FWP's Libby Isolation Facility and Murray Springs State Fish Hatchery. Established from a wild redband population, this brood is being developed to replace the stocking, for recreational purposes, of hatchery coastal rainbow trout or WCT, in drainages where redband trout are native. The effort will reduce the likelihood of additional hybridization of the species.

In the near term, the management direction for redband trout includes maintaining the existing distribution and genetic diversity of remaining populations, and developing conservation plans and projects that ensure long-term, self-sustaining persistence of the subspecies in Montana. Though recreational angling opportunities for the redband trout are currently limited outside of small streams, the development of a redband trout brood stock should provide future opportunities to establish recreational fisheries in closed-basin lakes in the Kootenai drainage. Likewise, efforts to secure and expand the distribution of existing populations and reintroduce them into streams where they have been lost will result in additional opportunities to pursue this unique native sport fish.

Management Plan

Montana Fish, Wildlife & Parks. 2013. Montana Statewide Fisheries Management Plan, 2013-2018. Montana Fish, Wildlife & Parks, Helena, Montana. 478 pp.

Columbia River Redband Trout Current Impacts, Future Threats, and Conservation Actions

Current Impacts	Future Threats	Conservation Actions
Culverts, dams, irrigation diversions, and other instream barriers that fully or partially impede movement and reduce connectivity of habitat	Culverts, dams, irrigation diversions, and other instream barriers that fully or partially impede movement and reduce connectivity of habitat	Removal or modification of barriers to restore beneficial fish passage Support habitat restoration projects similar to those implemented by the Libby Dam Mitigation Project (Holderman et al., unknown year)
Habitat degradation and fragmentation due to development	Habitat degradation and fragmentation due to development	Encourage and support opportunities such as land purchases or conservation easements to conserve upland areas adjacent to occupied Columbia River redband trout waters

Current Impacts	Future Threats	Conservation Actions
Hybridization	Hybridization	<p>Protect genetic composition by raising hatchery Columbia River redband trout</p> <p>Reduce stocking of non-native trout in sensitive areas</p> <p>Where appropriate and feasible, remove hybridized or competing populations of introduced species</p>
Geographically restricted range	Geographically restricted range	<p>Consider and investigate reintroduction efforts</p> <p>Consider preparing a management plan for the Columbia River redband trout or include it into other comprehensive taxonomic plans</p> <p>Identify specific areas where redband trout have been extirpated or severely reduced and work toward re-establishment of populations</p> <p>Survey areas where reintroduction efforts could occur</p>
Range and forest management practices, including the use of pesticides	Range and forest management practices, including the use of pesticides	<p>Encourage use BMPs for forest management activities to maintain diverse and resilient habitats within current range of redband trout</p> <p>Ensure species' requirements are included in forest plans</p> <p>Reduce stream intake of pesticides and herbicides</p> <p>Work with landowners and land management agencies to limit activities that may be detrimental to this species</p>

Current Impacts	Future Threats	Conservation Actions
	Climate change	Continue to evaluate current climate science models and recommended actions Maintain connectivity Monitor habitat changes and address climate impacts through adaptive management as necessary Routine monitoring of known populations

Additional Citations

Hensler, M. E., and C. C. Muhlfeld. 1999. Spawning ecology of redband trout in Basin Creek, Montana. A report to the Whirling Disease Foundation. Montana Fish, Wildlife & Parks, Bozeman, Montana.

Holderman, C., G. Hoyle, R. Hardy, P. Anders, P. Ward, and H. Yassien. Libby Dam Hydro-electric Project Mitigation: Efforts for Downstream Ecosystem Restoration. 9 pp.

Muhlfeld, C. C. 1999. Seasonal habitat use by redband trout (*Oncorhynchus mykiss gairdneri*) in the Kootenai River drainage, Montana. MS thesis, University of Idaho, Moscow, Idaho.

Muhlfeld, C. C., D. H. Bennett, and B. Marotz. 2001. Summer habitat use by redband trout in the Kootenai River drainage, Montana. North American Journal of Fisheries Management (February).

Lake Trout (*Salvelinus namaycush*)*

State Rank: S2
 Global Rank: G5

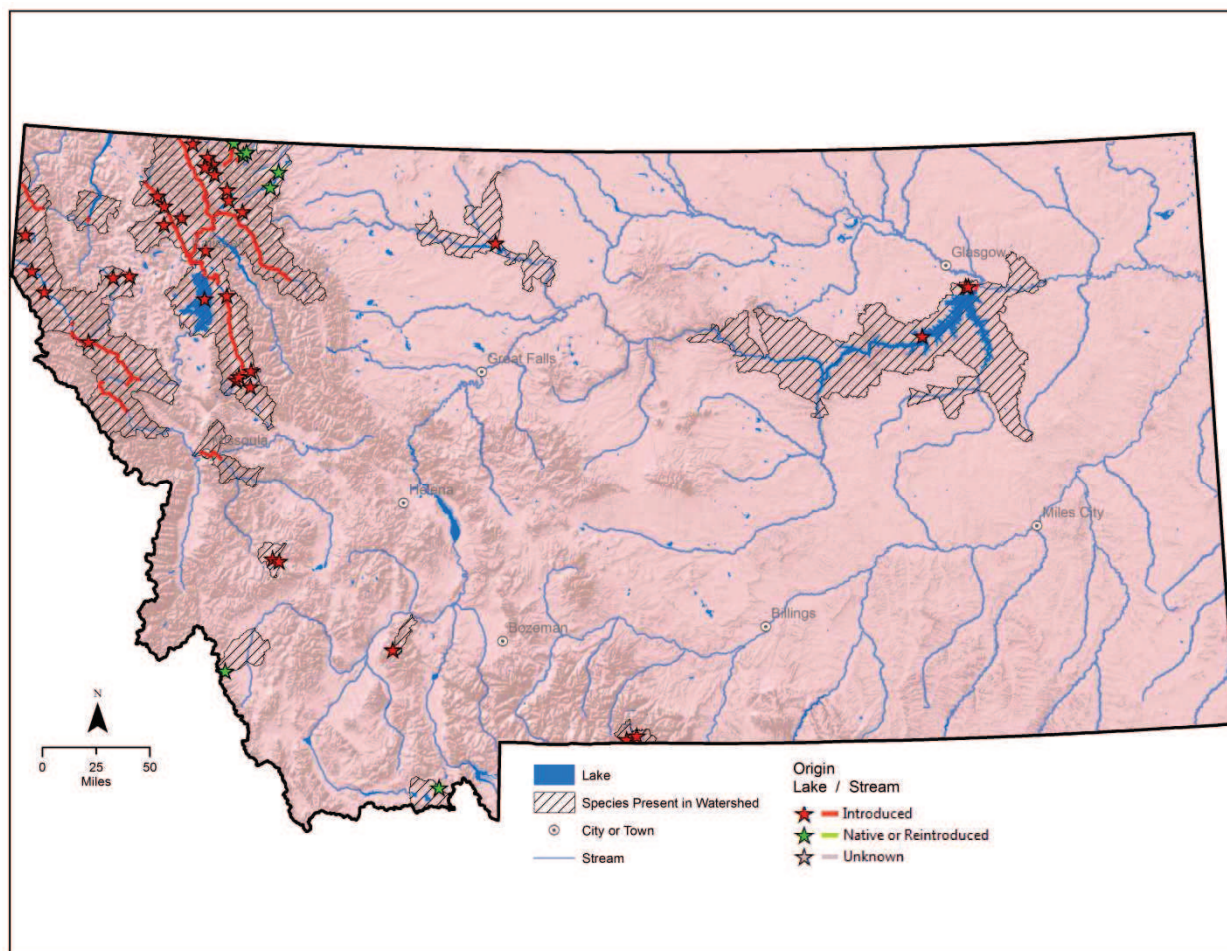


Figure 44. Distribution of lake trout

Habitat

While lake trout can be found in cold rivers and shallow lakes in the northern portion of its range (Scott and Crossman 1973) in Montana, native lake trout inhabit a few deep, cold lakes remaining from the Pleistocene glaciations. Montana's native lake trout populations remain in Waterton Lake, Glens Lake, Cosley Lake, and St. Mary Lake in Glacier National Park, and Lower St. Mary Lake in the Blackfeet Indian Reservation. All of these waters are in drainages that eventually reach the Hudson Bay. Other native populations occur in Twin Lake in the Big Hole River drainage and Elk Lake in the Red Rock River drainage, both tributaries to the upper Missouri River drainage.

Lake trout prefer water temperatures in the 50- to 57-degree F range and, therefore, spend most of their lives in the deeper, benthic habitats with these water temperatures. Lake trout can occasionally be found in shallow water habitats, usually immediately after ice-out when surface waters are within their preferred temperature range. They spawn in the fall on the rocky substrate of the shoreline. Lake trout scatter or broadcast their spawn, a rarity in the trout group.

Management

Management recommendations within this document pertain only to the Elk Lake and Twin Lake populations. Though additional information is necessary to better describe and monitor the status Montana's native lake trout populations, the Elk Lake population is believed to be relatively secure and stable. Recent data from the Twin Lakes population indicates the population is small and suffers from sporadic successful recruitment. It appears that spawning habitat in the lake is limited and while fish are long-lived in the lake, they only successfully spawn periodically. It is possible that alterations to the outlet of the lake have contributed to the decline in available spawning habitat. Future projects are needed at Twin Lakes to improve spawning habitat and increase the frequency of successful spawning to stabilize the population and ensure its long-term persistence. The populations in Waterton, Cosley, Glenns, and St. Mary lakes are afforded the protection of their location within Glacier National Park. The Waterton population is believed to be abundant and stable.

Management Plan

Montana Fish, Wildlife & Parks. 2013. Montana Statewide Fisheries Management Plan, 2013-2018. Montana Fish, Wildlife & Parks, Helena, Montana. 478 pp.

Lake Trout Current Impacts, Future Threats, and Conservation Actions

Current Impacts	Future Threats	Conservation Actions
Genetic bottlenecks caused by small size of remaining populations	Genetic bottlenecks caused by small size of remaining populations	Reintroduce genetically pure native populations
Irregular recruitment	Irregular recruitment	Increased monitoring and surveying
Limiting factors unknown	Limiting factors unknown	Identify and remedy limiting factors
Little information on native populations	Little information on native populations	Consider preparing a management plan for the lake trout (native lakes) or include it into other comprehensive taxonomic plans
	Climate change	Continue to evaluate current climate science models and recommended actions Monitor habitat changes and address climate impacts through adaptive management as necessary Routine monitoring of known populations

*Only native or reintroduced populations will be addressed.

Additional Citations

Scott, W. B., and E. J. Crossman. 1973. Freshwater Fishes of Canada. Bulletin 184. Fisheries Research Board of Canada, Ottawa. 966 pp.